

What is claimed is:

1. An isolation system for use in a well, the isolation system comprising:

a plurality of electrical devices in the well;

5 a current source adapted to supply a reverse-polarity current to the electrical devices; and

a fuse set to blow upon receiving the reverse-polarity current, wherein at least one fuse is arranged between the current source and one of the electrical devices.

10 2. The isolation system of claim 1, wherein each electrical device comprises a reverse-polarity protection diode.

3. The isolation system of claim 1, wherein a fuse is located between each electrical device and the current source.

15 4. The isolation system of claim 3, further comprising a set of seals adapted to hydraulically isolate each electrical device from the other electrical devices, wherein a seal is arranged between each electrical device and the fuse.

20 5. The isolation system of claim 1, further comprising:
an electrical line adapted to connect the current source to the electrical devices.

6. A system for use in a well, the system comprising:

a fuse in communication with and between an electrical line and a downhole electrical device;

a reverse-polarity current source; and

5 a reverse-polarity protection diode in communication with and between the electrical device and the fuse.

7. The system of claim 6, wherein the reverse-polarity current source is adapted to deliver a current of sufficient magnitude to blow each fuse.

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8. The system of claim 7, further comprising an operating current source connectable to the electrical line, wherein the operating current source is adapted to deliver a current of sufficient magnitude to operate the electrical devices.

15 9. The system of claim 8, wherein each diode is adapted to provide a current path from the electrical line to the electrical device in response to the operating current, and to interrupt the current path from the electrical line to the electrical device in response to the reverse-polarity current.

20 10. The system of claim 9, further comprising a switching device moveable between: (i) a first position wherein the electrical devices are in connection with the power source, and (ii) a second position wherein the electrical devices are in connection with the reverse-polarity current source.

11. The system of claim 6, wherein the electrical devices comprise gauges adapted to measure data in the well and communicate the data to a surface monitoring system.

5 12. The system of claim 11, wherein the gauges are adapted to measure and communicate temperature and pressure data in the well.

13. The system of claim 11, wherein the gauges are adapted to measure and communicate fluid flow and density data in the well.

10 14. The system of claim 11, wherein the gauges are adapted to measure and communicate wellbore fluid pH data.

15 15. The system of claim 6, wherein the electrical devices comprise valve controls adapted to manipulate fluid flow into or out of the well.

16. The system of claim 6, further comprising a seal between the fuse and each electrical device, the seal adapted to hydraulically isolate each electrical device to prevent an infiltrating conductive fluid from migrating throughout the electrical devices.

20 17. The system of claim 6, wherein each fuse is fabricated from a material capable of enduring downhole thermal and mechanical stress.

18. A downhole connector, comprising:

a housing, comprising: (i) a first electrical connection, (ii) a second electrical connection, and (iii) a third electrical connection;

5 a plurality of fuses, comprising: (i) a first fuse arranged between the first electrical connection and the second electrical connection, and (ii) a second fuse arranged between the first electrical connection and the third electrical connection; and

a plurality of seals, comprising: (i) a first seal located near the second electrical connection, and (ii) a second seal located near the third electrical connection.

10 19. The downhole connector of claim 18, wherein the first connector is adapted to connect the housing to a surface system via an electrical line.

20. The downhole connector of claim 18, wherein the second connector and third connector are adapted to connect the housing to a plurality of downhole electrical devices.

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21. The downhole connector of claim 20, wherein the first fuse and second fuse are adapted to electrically isolate each downhole electrical device from the other downhole electrical devices.

20 22. The downhole connector of claim 20, wherein the first seal and second seal are adapted to hydraulically isolate each downhole electrical device from the other downhole electrical devices.

23. A method, comprising:

electrically isolating a short circuited electrical device from another electrical device by blowing a fuse, wherein the electrical devices are located downhole.

5 24. The method of claim 23, further comprising:

hydraulically isolating the short circuited electrical device from another electrical device by sealing the short circuited electrical device.

25. The method of claim 23, further comprising:

10 applying a reverse-polarity current to blow the fuse.

26. The method of claim 25, further comprising:

preventing the reverse-polarity current from damaging the other electrical device when blowing the fuse.

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27. A method, comprising:

providing a plurality of electrical devices connected to an electrical line in a well, the electrical line comprising a tubular encasement;

preventing hydraulic flow through at least a portion of the electrical line; and

20 selectively isolating the electrical devices using fuses.